ITCS 113 – Fundamentals of Programming
Lecture 2: Extra Exercises

No Need to Submit but Practices (ALL) is encouraged.

Q1: Write the C program to check whether the given input width and height form a "square" or not and calculate the area. The area should be shown in two decimal places. If the user input invalid width or height, e.g. zero or negative numbers, display the error message.

Sample inputs and output

#	Input	Output	Expected Screen Output
1	3 3	Square Area=9.00	3 3 square Area=9.00
2	4.2 3.5	Not square 14.70	4.2 3.5 Not square 14.70
3	-1 4	Invalid	-1 4 Invalid
4	0 5	Invalid	0 5 Invalid

Q2: Write a C program to check if the value of X matches the following criteria, including:

- X is "Negative" or "Positive"
- X is "Odd" or "Even"
- X is ending with "7"
- X is divisible by "3" or "5"

The program must print all criteria that X match.

Sample inputs and output

#	Input	Output	Expected Screen Output
1	10	Positive Even Divisible by 5	10 Positive Even Divisible by 5
2	-7	Negative Odd Ending with 7	-7 Negative Odd Ending with 7

#	Input	Output	Expected Screen Output
3	-5	Positive Odd Divisible 5	-3 Positive Odd Divisible 5
4	3	Positive Odd Divisible by 3	3 Positive Odd Divisible by 3
5	27	Positive Odd Ending with 7 Divisible by 3 and 5	27 Positive Odd Ending with 7 Divisible by 3 and 5

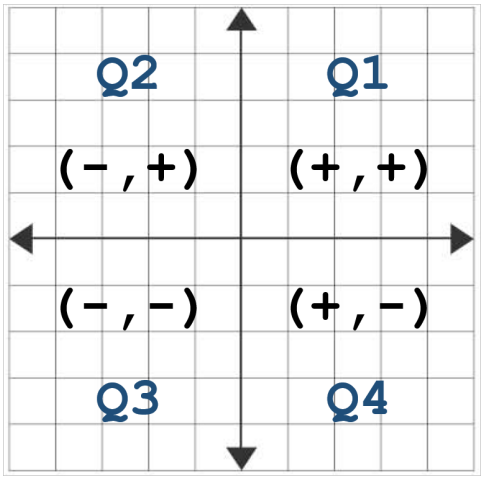
Q3: Write the program to receive the temperature and option: 1: Convert Celsius to Fahrenheit and 2: Convert Fahrenheit to Celsius. The program should display the result of converted temperature in two decimal places. Given the formula of Celsius to Fahrenheit:

$$T\,(°F) = T\,(°C) \times 9/5 + 32$$

Sample inputs and output

#	Input	Output	Expected Screen Output
1	100 1	212.00	100 1 212.00
2	0 2	17.78	0 2 17.78

Q4: There are 4 quadrants in the coordinate plane. Write a C program to determine to the quadrants of the given point `(x, y)`. The program should receive a `x` and `y` values then use the following graph below to determine the quadrant and show, `"Q1"`, `"Q2"`, `"Q3"` or `"Q4"` according to its quadrant. If the point lies on the axis, i.e., any `x` or `y` has 0 value, print out `"No quadrant"`



Sample inputs and output

#	Input	Output	Expected Screen Output
1	1 0	No quadrant	1 0 No quadrant
2	1 1	Q1	1 1 Q1
3	-2 2	Q2	-2 2 Q2
4	-1 -3	Q3	-1 -3 Q3
5	3 -3	Q4	3 -3 Q4

Q5: A Leap year is a year that has an additional day, i.e., 366 days. To determine a leap year, check the following conditions:

- If the year is divisible by 400, it is a ***leap*** year e.g. 2400, 2800
- If the year is divisible by 100 but it is not divisible by 400, it is a ***common*** year e.g. 2100, 2200, 2300
- If the year does not match the two criteria above but is divisible by 4, it is a ***leap*** year, e.g. 2024, 2028, 2032
- Otherwise, it is a ***common*** year. E.g. 2021, 2022, 2023

Write a C program that receive a year from users, determine the type of year, and display if it is a “Common” year or “Leap” year.

Sample inputs and output

#	Input	Output	Expected Screen Output
1	2000	Leap	2000 Leap

2	2100	Common	1900 Common
3	2024	Leap	2004 Leap
4	2023	Common	-1 -3 Q3

Q6 Write a C program with **`switch-case`** to print out the Mahidol Core Value given an input character. The program first receives an input character `'M'`, `'A'`, `'H'`, `'I'`, `'D'`, `'O'`, and `'I'`; both UPPER case or lower case. If the user inputs other character, display "`Invalid character`".

The Mahidol Core Value are as follows: M:Mastery, A:Altruism, H:Harmony, I:Integrity, D:Determination, O:Originality, L:Leadership

Sample inputs and output

#	Input	Output	Expected Screen Output
1	M	Mastery	M Mastery
2	H	Harmony	H Harmony
3	h	Harmony	h Harmony
4	X	Invalid character	Invalid character
